

PineRidge

At Castle Pines North
Douglas County, Colorado



Community Wildfire Protection Plan

Date Prepared: April 2007

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1. Introduction

The Healthy Forest Restoration Act (HFRA) signed into law in December of 2003, directs federal, state and county agencies to collaborate with communities and interest groups in developing a Community Wildfire Protection Plan (CWPP). A CWPP specifically identifies strategies that reduce wildfire fuels and the risk of home ignitions, while improving forest health and fire fighting response capabilities. A CWPP improves opportunities for obtaining Federal wildfire mitigation grants and may also provide access to other potential grants for improved safety in the wild land urban interface. This CWPP belongs to PineRidge Homeowners Association (HOA) and will serve as a guide in the management of the property to meet specific objectives that are consistent with the principles of good forest stewardship. It is a living document and will be reviewed annually and modified when required. The objectives are:

- To mitigate wildfire hazard on the property by treating the accumulation of fuels in Gambel¹ oak and ponderosa pine in the open space and on individual lots.
- To minimize the activity of destructive forest insects and diseases.
- To maintain and improve the health and vigor of individual trees and the open space as a whole.

2. Community Description

General: PineRidge is a small, relatively new housing development in the community of Castle Pines North, located in unincorporated Douglas County, Colorado. There are a total of 100 residences, consisting of 20 single-family patio homes, 16 duplex units and 12 four plex units. The residences are built in close proximity to one another on small lots and are consolidated in the northeast corner of the development. The southwest corner of the development, which is contiguous to the residences, is comprised of approximately 22 acres of forested open space.

In addition to the Ridge of Castle Pines North Golf Course, PineRidge is adjacent to: the Sanctuary Golf Course^{*} overlooking the Plum Creek valley, historic Daniels Park[†] - home to a heard of buffalo and the Tall Bull[‡] Memorial Grounds, 3,100 acres of the Cherokee Ranch[§], and 7,000 acres of Highlands Ranch open space. There are pine covered hills, dramatic rock outcroppings, and panoramic mountain views that include Pikes Peak and Devils Head^{**}.

¹ Gambel oak is commonly called scrub oak, but other common names are Rocky Mountain white oak and Utah white oak. The scientific name is *Quercus gambelii*, after William Gambel, an American naturalist. It is a fire-adapted species because of its ability to grow back quickly from root sprouts after a fire kills the tops. The plant requires full sun and is adapted to dry, rocky sites and alkaline soils. Once established, Gambel oak is quite drought tolerant.

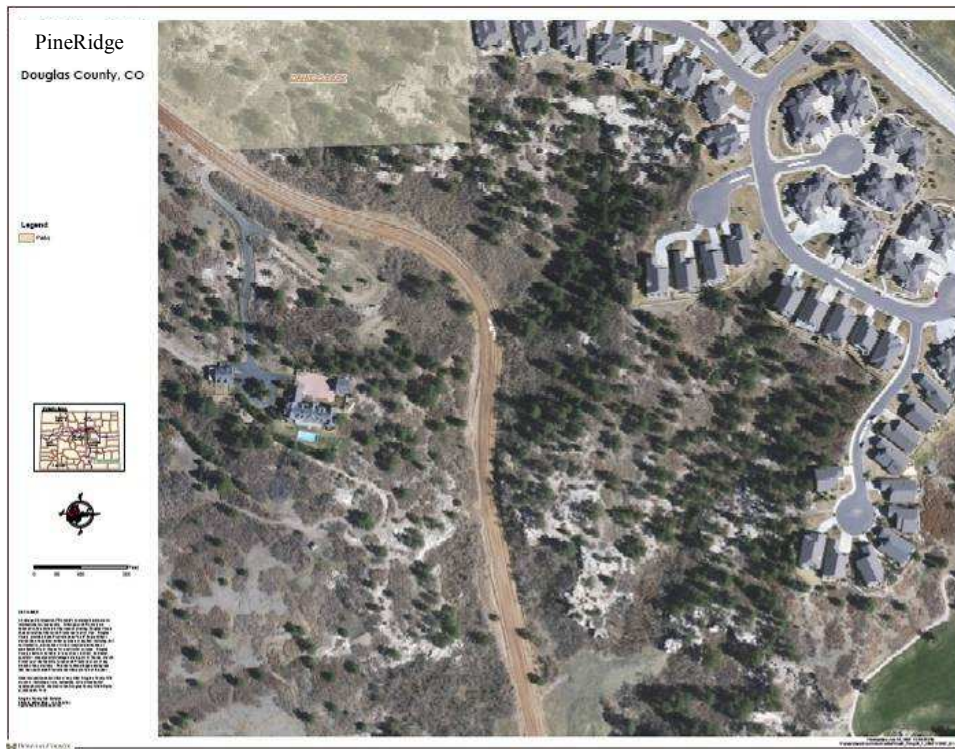


Fig. 1: **PineRidge Site Map**, Refer to Appendix A, Pg. 14 for full page version

Vegetation/Fuels: While the home sites are small with limited landscaping, the 22 acres of forested open space south and west side of the community contain abundant vegetation and wildfire fuels on steep terrain. The open space is dominated by Gambel oak and mountain mahogany with a low density, healthy stand of Ponderosa pine. This creates a two level forest - the most hazardous type - with oak, pine regeneration, and other shrubs, growing beneath a pine canopy and producing ladder fuels¹ to the tree crowns. {For a full page Vegetation map of PineRidge, Reference Appendix A – Maps, Pg. 15}

History: On a sunny fall day in late October of 2003, high winds blew down a tree in neighboring Cherokee Ranch that landed on power lines and sparked a wildfire. This fire eventually destroyed nearly 1,000 acres. The location was typical Douglas County open space, i.e. a ponderosa canopy with a heavy gamble oak under story and sloping terrain. Weather conditions were extremely conducive for a rapidly growing fire. The temperature was in the 80's with a relative humidity of 10%, and the winds of 20-30 were gusting to 40 mph. As smoke filled the sky and fire came within a few hundred feet of PineRidge, all residents were evacuated along with 3,000 others from Castle Pines North and neighboring Castle Pines

¹ Ladder Fuels: Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease.

Village. Fortunately a cold weather front moved into the area that night, changing the conditions and the fire was contained.

Soon after that terrifying day, PineRidge gathered for a potluck “So Glad We Didn’t Burn” party. As stories, experiences, and fears were recounted, the realization of how lucky we were to still have our homes and 22 acres of incredibly beautiful open space, prompted commitment and action. Several residents participated in the first mitigation project done by the builder Genesee and were familiar with the original Colorado State Forest Service (CSFS) plan and work done in 2002. A committee was formed to research the various elements of fire mitigation and create an immediate and comprehensive plan.

The Castle Pines North Master Homeowners Association held a forum featuring South Metro Fire & Rescue and the promotion of “fire wise communities”. At this meeting, members of a PineRidge Fire Mitigation Committee learned of a public outreach program developed by the Douglas County Wildfire Mitigation Staff. Through this program, committee members met with wildfire mitigation specialists and CSFS to assess the PineRidge property, to outline a plan, and to define a process for implementing the plan. The specialists from CSFS also helped the committee in submitting a grant application for funding. PineRidge was subsequently awarded a grant, thereby enabling the overall plan to be completed in one stage. Throughout the process, the committee held several meetings and distributed email messages and newsletters to inform residents and neighboring communities of the process in developing a fire wise community. The fire mitigation efforts of PineRidge were featured in several articles in *The Connection*; a local community newspaper for Castle Pines North.

3. Collaboration

A basic requirement for a CWPP is that it be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties. The CWPP for PineRidge expanded on a basic Wildfire Mitigation Plan written by CSFS in 1999 for the PineRidge developer, Genesee Homes. Before turning over the property to the homeowners and the PineRidge HOA in 2002, Genesee performed the mitigation work as outlined in the initial plan and created a 50 foot defensible zone in the forested open space adjacent to residences. Working with CSFS and Douglas County Fire Mitigation Specialists, the plan was revised in 2005 and the PineRidge HOA applied for and was awarded a grant from CSFS to implement the revised plan and further reduce wildfire fuel hazards. Additional collaboration with South Metro Fire and Rescue defined an aspect map, a risk assessment, and a detailed scope of work.

In April 2007, PineRidge held a meeting for neighboring communities to describe information gathered and experiences encountered while putting the plan into operation. The meeting included a presentation and demonstration of the mechanical equipment and processes to be used by the contractors. Representatives from various entities were invited, they were; Douglas County Emergency Preparedness, South Metro Fire & Rescue, Douglas County Fire Mitigation Specialists, Colorado State Forest Service, Horticare, Inc., Castle Pines North (CPN) Metro District, Denver Parks, Cherokee Ranch, The Sanctuary Golf Course and The Ridge of Castle

Pines North Golf Course. Two representatives from each of the HOAs in all of Castle Pines North and the Castle Pines Village Management were invited to attend.

As the actual thinning and mulching work progressed and the visible results began taking shape; the contractor was hired to provide additional work on adjacent grounds by several entities, including: CPN Metro District, Douglas County Operations, and The Ridge of Castle Pines North Golf Course.

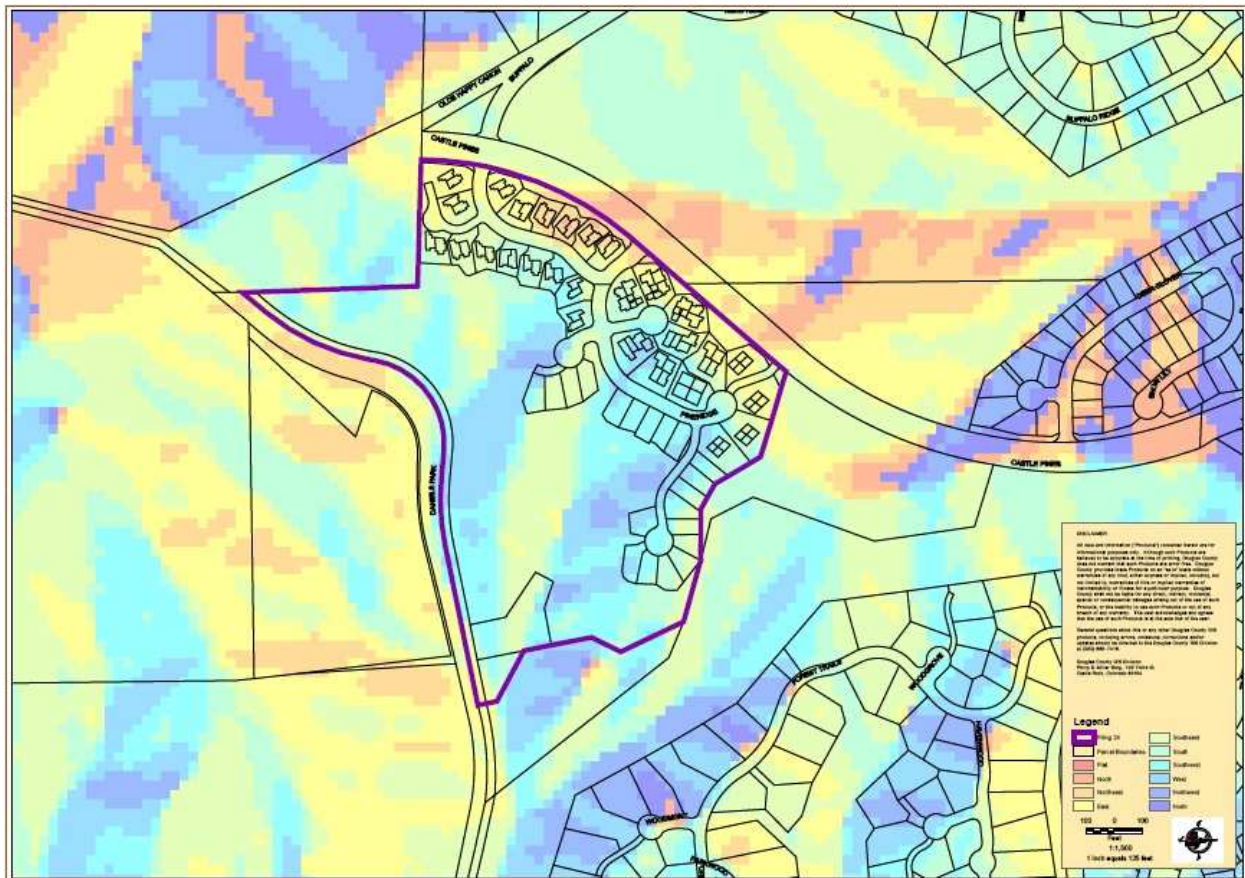


Fig. 2: PineRidge Aspect Map, Refer to Appendix A, Pg. 16 for full page version

4. Community Risk Assessment

Typical Wildfire Behavior: Wildfire behavior and severity are dictated by terrain, weather conditions, and type of fuel. *Crown¹ wildfires* are catastrophic and typically occur in areas of dense forest, steep terrains, plentiful ladder fuels and lower tree moisture levels. They jump downwind by spotting, torching² and burning from the ground all the way through the tree crowns. They destroy forests, killing all or most trees, sterilizing soils, and accelerating erosion. *Ground wildfires* are less catastrophic and are typical in areas where trees are thinned and

¹ Crowning: A forest fire that advances with great speed jumping from crown to crown ahead of the ground fire

² Torching: Fire burning principally as a surface fire that intermittently ignites the crowns of trees or shrubs as it advances.

trimmed of low branches with substantial gaps in the canopy, ladder fuels are removed, and moisture levels are higher. Ground wildfires burn through a forest with flames that stay near the ground that generally do not reach up into the canopy¹.

Terrain - Fire tends to burn more rapidly and intensely upslope than on level terrain. Slope also plays a significant roll in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south, and west slopes with fuels that are exposed to the wind. Increasing slope causes fires to move from surface fuels to crowns more easily due to preheating. A slope of 30% causes the fire spread rate to double; compared to the same fuels and conditions on flat ground. Chimneys², saddles³ and deep ravines are all known to accelerate fire spread and influence the intensity. In some instances, Chinook⁴ winds can rapidly drive wildfire down slope.

Weather - Weather conditions are ultimately responsible for determining fire behavior. Moisture, temperature, and relative humidity determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant affect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape. Weather conditions such as high ambient temperatures, low relative humidity, and windy conditions favor fire ignition and erratic fire behavior.

Fuel - Fuel is the only variable that can be managed by reducing such attributes as amount, continuity, or size class distribution. Douglas County, Colorado open space typically contains native grasses, Gambel oak, and ponderosa pine creating a typical two level forest. Gambel oak grows in clumps of many stems coming from a dense, connecting, and deep root system of rhizomes⁵. If the above ground stems are removed or injured, the rhizomes send up numerous sprouts to take their place. A typical oak thicket is approximately 6 to 10 feet tall. Younger oak is predictably shorter, but the older oak stands may grow to 20 feet in height. Gambel oak can produce flames that extend 2.0 to 2.5 times its height. The heat generated by a unit of burning oak is 40% greater than an equal unit of ponderosa pine. Gambel oak is notorious for re-sprouting quickly after being cut. Cutting should be done after it has fully sprouted, but before it begins to lose its leaves in the fall. If nothing is done to prevent re-sprouting, the new vegetation will likely grow taller and denser, than the original oak within 2 to 3 years. The most cost-

¹ Canopy: The uppermost level of a forest, formed by the tree crowns.

² Chimney: A narrow cleft in a cliff that resembles a chimney

³ Saddle: A ridge between two peaks or a depression in the ridge of a hill that is shaped like a saddle

⁴ Chinook winds: A warm dry wind that descends from the eastern slopes of the Rocky Mountains, causing a rapid rise in temperature. In the winter season, down slope winds, often characterized by unseasonably warm temperatures (sometimes leading to dramatic temperature rises), and are called Chinook winds.

⁵ Rhizomes: Horizontal underground stems that strike new roots out of their nodes, down into the soil, and that shoot new stems out of their nodes, up to the surface. This rhizome activity represents a form of plant reproduction.

effective method to prevent re-sprouting is to apply an approved herbicide to the oak stumps. This should be done within 2-3 minutes after cutting. *{For additional information on recommended herbicides and application techniques, see Appendix B, Pgs. 19 & 20}.*

Fuel breaks¹, thinning trees and shrubs, creating defensible space, mowing grass, and creating green strips are ways to manipulate fuels to reduce the chances of fire occurrence or to limit its severity. A compelling body of evidence demonstrates that by performing thinning in an otherwise catastrophic fire-prone forest; risk can be dramatically reduced and safety enhanced. Experience supports that even a dangerous crowning and torching fire that spreads into a forest area that has been properly treated with thinning procedures, may “lay down” to become a manageable ground fire.

Fire Hazard Risk Ratings: As determined by Colorado State Forest Service Wildfire Hazards are:

- A- low hazard - meadow areas and open ponderosa pine.
- B- medium hazard - low density ponderosa pine areas.
- C- severe hazard - high density ponderosa pine and heavy Gambel oak areas.
- X- severe hazard - brush, heavy continuous oak brush.

Risk to PineRidge: Wildfire hazards on the PineRidge property are comprised of B-medium hazard in the dense ponderosa pine stands, and X-severe hazard-brush in the oak brush stands. This creates a two-level forest with widespread Gambel oak, pine regeneration, and other shrubs, growing beneath a dense pine forest. This type of forest is the most hazardous because Gambel oak and pine regeneration are ideal ladder fuels to the tree crowns. The dense areas of ponderosa pines contain some snow bent trees, but generally this is a healthy stand. The most serious fuel hazard to PineRidge is the large amounts of deadwood Gambel oak along Daniels Park Road. The typical life span for Gambel oak is 90 years and the PineRidge stand ranges from 1 to 40 years. The unpaved condition of Daniels Park Road is a significant factor in the amount of dead woody debris. Increasing amounts of traffic and dry conditions cause an excessive coating of road dust on plant life on the upslope. A frost kill that occurred in 2003 contributed to the amount of deadwood.

In addition to the hazardous deadwood and fuel densities, the steep terrain with numerous ravines, cliffs and rock outcroppings, contributes to the severe potential fire risk to PineRidge. The slopes, some as much as 25%, can cause the fire spread rate to double. The homes built at the top of ridges and slopes are most at risk. High winds, sometimes 60 mph, are not uncommon. *{For a full page Slope map of PineRidge, Reference Appendix A – Maps, Pg. 17}*

Risk of Ignition

Wildfires are caused by both human and natural ignitions. Types of human ignitions include unattended or abandoned campfires, vehicle fires, cigarettes, arson fires, and sparks or arcs from power lines or transformers. The most typical natural ignition source is lightning. PineRidge is at high risk for a human caused fire, primarily due to the number of vehicles on unpaved Daniels Park Road, picnickers using Daniels Park, and cigar and cigarette use on adjacent golf courses.

¹ A fuel break, firebreak or fireroad is a gap in vegetation or other combustible material that is expected to slow or stop the progress of a wildfire

Community Values at Risk

Homes: In PineRidge there are 100 residences, consisting of 20 single patio homes, 16 duplex units and 12 four plex units. The residences are built in close proximity to each other with minimal spacing between buildings sometimes as narrow as ten feet. The lots are small and consolidated in the northeast corner of the community. Twenty two acres of forested open space border a little more than 50% of the homes and units on the south and west; all located at the top of forested steep terrain. PineRidge is a relatively new covenant controlled community, constructed in the last seven years with fire resistive materials; Class C or better. The homes are fueled by natural gas thereby eliminating propane tank storage and stacks of firewood. Covenants are strictly enforced. Nothing is to be stored in the open space, yards or on decks and patios. Fire of any kind in the open spaces is strictly prohibited. Torches, open fires, chimeneas and fire pits are not permitted anywhere within the community.

Native Ecosystems: 75 – 125 year old forest with stately pines and native shrubs and abundant wildlife. There are intermittent wildlife trails throughout the property, mostly mule deer and elk. A herd of 500 elk travel freely between PineRidge, The Sanctuary, The Ridge and Cherokee Ranch. There have been numerous sightings of black bear and mountain lion. Coyote, red fox, porcupine and cottontail rabbits are also frequent habitants.

Businesses: The Ridge is the premier public golf course in Colorado and The Sanctuary, a private golf course is known for its charitable events. A wildfire could cause significant damage to the courses, the clubhouses, and overall business for both locations.

Historic Daniels Park: Daniels Park Road, still unpaved, was once an old stagecoach route that ran along the first territorial road in Colorado. Tall Bull Memorial Grounds located at the north end is a special haven and Native American meeting site for many years.

5. Local Preparedness and Firefighting Capability

- The Castle Pines North Area which includes the Pine Ridge Subdivision lies within the boundaries of South Metro Fire Rescue (SMFR) www.southmetro.org.
- SMFR is a special district which provides an all risk emergency responses. The district operates from 10 staffed stations located throughout the district with approximately 65 personnel on duty 24 hours a day 7 days a week. Automatic Aid agreements are in place with all neighboring jurisdictions to provide assistance whenever it is needed.
- 911 calls are routed through Douglas County Sheriff's office to the Metropolitan Area Communications Center (METCOM) www.metcom911.org. METCOM dispatches and handles all communications for SMFR.
- Reverse 911 is available to the Castle Pines North area via the Douglas County Sheriff's communications center. Incident Commanders can request a reverse 911 call to residents in the area; the 911 operator will give instructions to the residents at the time of the call including best evacuation routes from the area.
- Initial response to a Wild Land Urban interface incident will consist of the following staffed apparatus:
 - (3) Engine companies- Type 1
 - (1) Advanced Life Support Paramedic Unit
 - (1) Water Tender
 - (1) Compressed Air Foam Tender
 - (3) Brush Trucks- Type 3 or 6
 - (1) Battalion Chief
 - (1) EMS Supervisor
 - (1) Incident Safety Officer

Additional apparatus may be requested and assigned based upon information gathered from initial information including 911 calls and/or current weather and fuel conditions (i.e. Red Flag Warning days).
- All SMFR personnel are provided at least 8 hours of annual Wildland Fire refresher training. In addition, SMFR has a specially trained Wildland Fire Team which consists of approximately 50 individuals. These personnel are trained to specialize in Wildland Fire incidents.
- SMFR has purchased software (Red Zone, www.redzonesoftware.com) to assist in hazard identification, mapping, structure assessment, etc. Implementation and field use of this software is planned for the Castle Pines North area, including the Pine Ridge Subdivision. This will be a valuable tool for first responders as well as property owners in the area.
- Water Sources:

{For a full page Hydrant Map of PineRidge, Reference Appendix A – Maps, Pg. 18}

6. Community Action Plan

Purpose: Two important objectives of a Community Wildfire Protection Plan are to identify hazardous wildfire fuels and develop a strategic plan of treatment priorities to reduce the risk of potential home ignitions. The purpose of hazardous fuel reduction is to interrupt fire momentum and reduce potential for fire to spread into tree canopies and Gambel oak tops. The extent of hazardous fuel reduction depends on height and density of vegetation, steepness of slope, and distance from structures.

Maintaining or improving the aesthetics of a neighborhood is a primary consideration in prescribing fuels reduction treatments. The visual impact of fuels reduction can be eased with irregular cutting patterns and isolated groupings that create natural mosaics based on the vertical arrangement and horizontal continuity of the existing landscape. Crown separation is emphasized over stand density; and attractive, defensible space is preferred over precise stem spacing. Working with the topography and mimicking natural growth patterns is the basis for developing a plan that not only reduces hazardous fuels, but also improves forest health, wildlife habitats, and overall good forest stewardship – along with maintaining the aesthetic representation of the community.

Identification and Treatments: To aid in the process of identifying fuel reduction treatments and priorities, the open space was divided into three Management Zones.

Management Zone #1: Defensible zone along homes: Previously a 50 foot strip along the residences had been mitigated. This zone was increased to a 50-100 foot strip and re-mitigated. Where oak densities are high, the prescription is to create a mosaic of small clumps with original 3' to 5' stem spacing and limbed 2' to 3' above the ground. New undergrowth needs to be removed past the drip line of ponderosa trees. All the dead wood in the residual oak needs to be removed.

Management Zone #2: Defensible zone along Daniels Park Road – The road presents a limited natural fuel break that can easily be expanded to create an open park-like appearance. Fuel density can be considerably reduced, thus improving fire control opportunities. The 50 to 100 foot strip of open space along the road contains a significant amount of dead oak. All dead oak and brush should be removed. Depending on fuel and terrain, vegetation should be thinned, ladder fuels, low limbs and heavy regeneration removed. Again the prescription is to create a mosaic of small clumps. Target removal percentage for the oak in the dense areas is 65%.

Management Zone #3: Interior balance of open space – The primary goal in the remaining space is fuel reduction. Steep ravines and large rock outcroppings are located throughout the interior open space. The tops of these ridges are good locations for fuel breaks. Where oak is present under pines, oak needs to be removed past the drip line of the tree. Clumps of pines need to be thinned to remove suppressed trees and create positive crown spacing. Crown separation should be emphasized over stand density levels and isolating groupings rather than cutting for precise stem spacing.

7. Implementation and Management Schedule

Immediate: A grant award from CSFS accelerated implementation of the 2005 revised plan. With assistance from CSFS, Douglas County Fire Mitigation Specialists and South Metro Fire and Rescue, a detailed scope of work integrating prescribed treatments for all three management zones were incorporated into a Request for Proposal. In the process of interviewing contractors, different approaches for reducing hazardous wildfire fuels were evaluated. It was determined that a dual approach, a mechanical bull hog¹ for large accessible areas, along with hand work for the detailed areas, would be the most successful. The bull hog handles standing trees up to 8" in diameter, cutting and grinding into mulch quickly in a single process. It is efficient and cost effective. Not only would hazardous wildfire fuels be reduced, but also, the treated areas would be aesthetically pleasing and park like. It was determined that herbicides would not be used at this time. Herbicides are a permanent treatment and costly; they are best applied when regenerative growth is identified as detrimental. Contractors were evaluated, selected and work was to begin in November 2006, however, a severe winter with heavy snows prohibited any actual fuel reduction until spring of 2007.

Future: Hazardous wildfire fuel reduction must be maintained to be effective. Gambel oak is notorious for re-sprouting quickly after being cut. The overall effectiveness of a treated area may be lost in as little as three to four years if ladder fuels and regeneration are not controlled. Assessing and maintaining wildfire fuels in the open space, as well as multi-family and individual residences, will include the following steps:

- Each zone will be evaluated annually to determine the extent of regeneration and possible changes to prescription treatments. It is estimated that maintenance on the management zones will begin in 2010. Based on annual evaluations, one or more zones may be treated at that time. Zones not treated in 2010 will be treated subsequently on a rotating cycle every year. The possible use of herbicides in particular areas will be researched and evaluated.
- In addition to reducing fuels, Ponderosa pine trees are inspected and a significant number are sprayed each year to protect against bark beetle. Herbicides are applied to noxious weeds and landscaping with native plants and grasses is encouraged.
- PineRidge will work with South Metro Fire & Rescue to implement the Red Zone software that will assist in hazard identification, mapping, structure assessment, etc. This should be a valuable tool for residents to improve the defensible space around their homes.
- Each year at the annual homeowners meeting for PineRidge, fire mitigation and this CWPP will be an agenda item. Time will be spent reevaluating the CWPP, as well as

¹ Mechanical bull hog: A large mobile wood shredder

educating new homeowners on defensible space requirements and maintaining clean and uncluttered patios and decks.

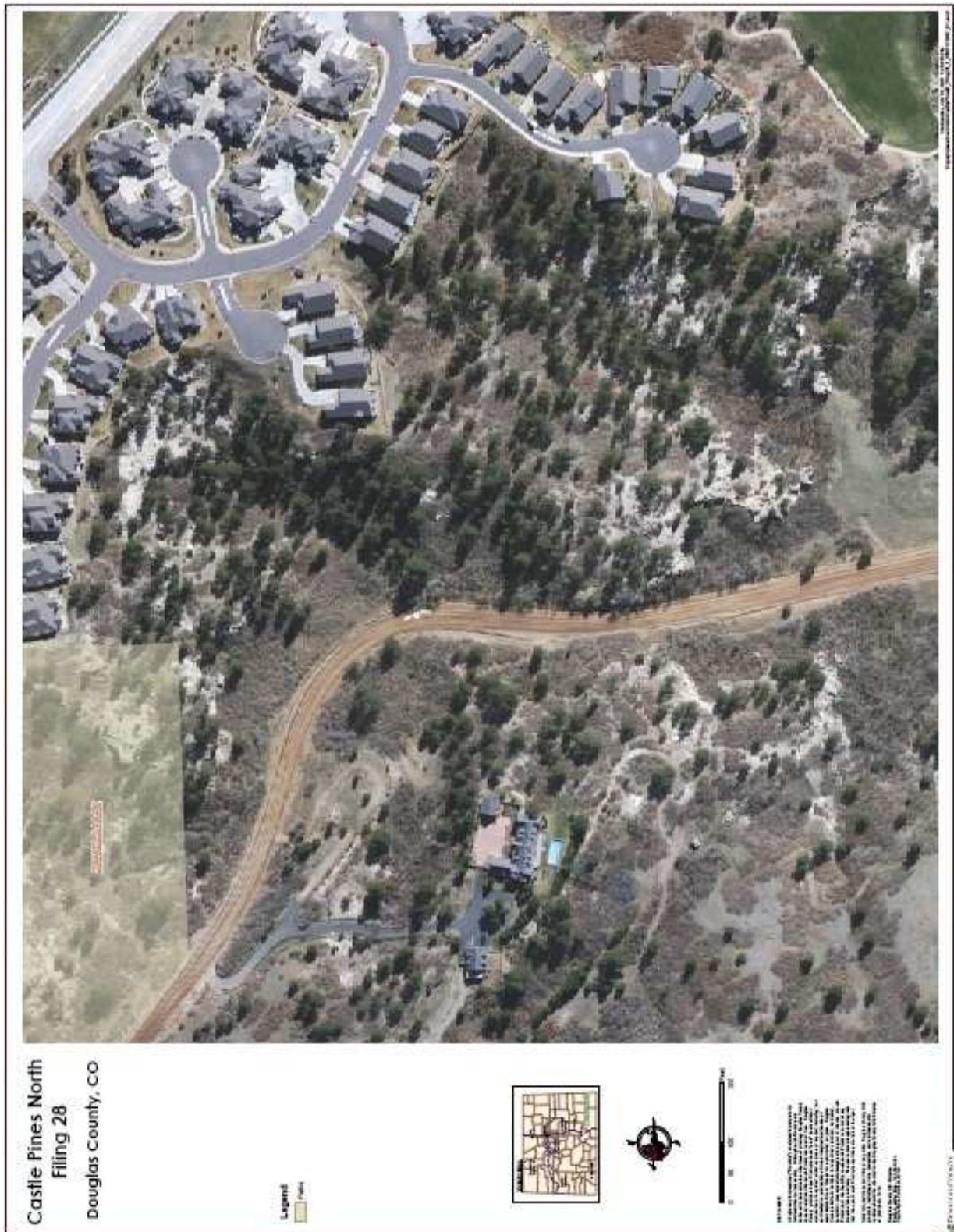
- The PineRidge HOA board and Architectural Review Committee will encourage the use of fire wise recommendations as outlined in educational fact sheets from the Colorado State Forest Service {*refer to Appendix C*}. This would include items such as: replacing wood railings on decks with metal or composite materials, re-roofing and residing with upgraded fire retardant materials, landscaping with defensible space around residences, etc.

Funding: Funds to match the grant dollars will be spent in 2007 to implement the treatment procedures for the three management zones according to the plan. Beginning fiscal 2007, a minimum of \$5,000 will be budgeted each year for fire mitigation maintenance. Additional grants will be pursued to help offset the maintenance costs.

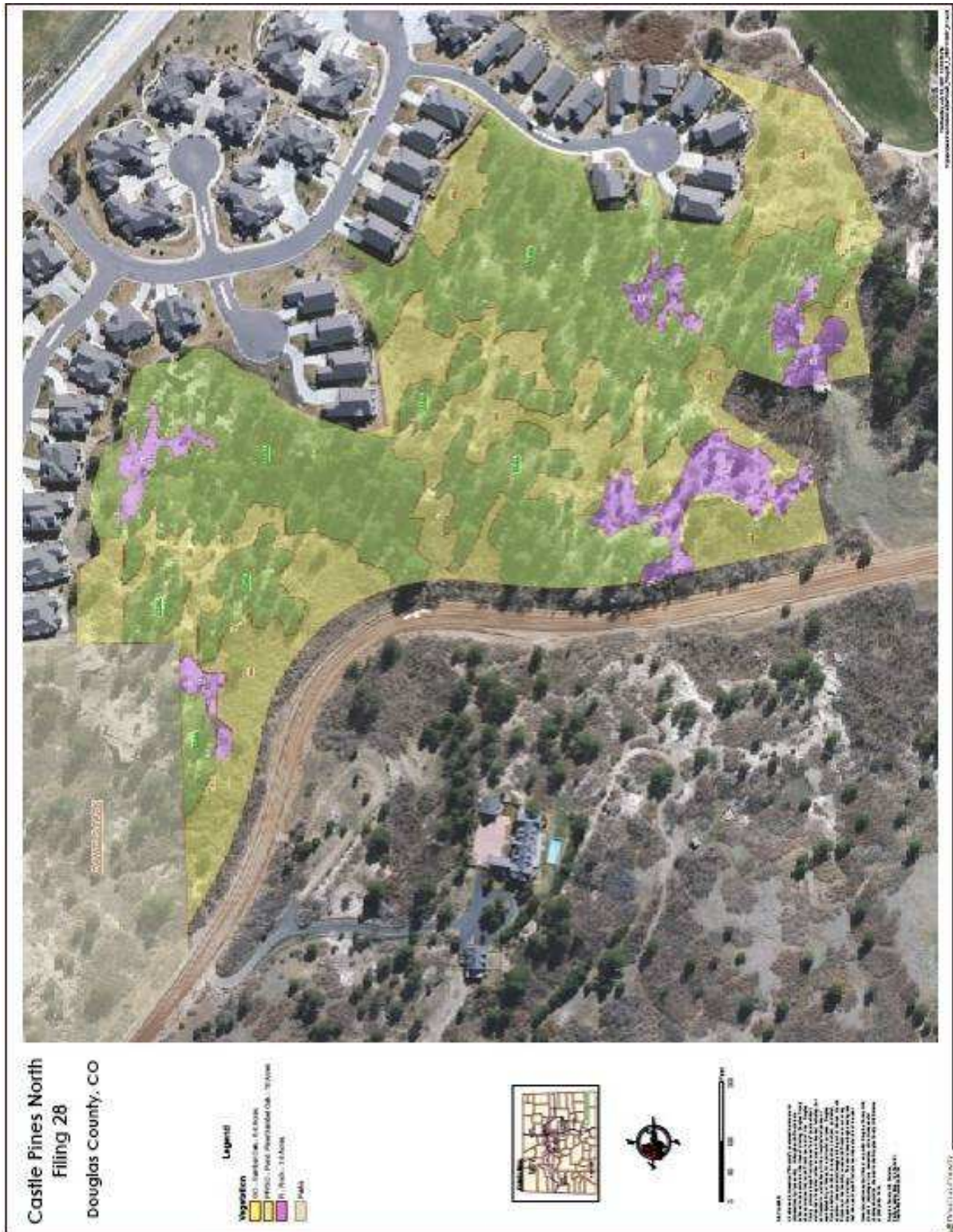
8. Summary and Conclusion

The PineRidge CWPP is a living document that will be modified as needed. As new processes and products become available, they will be researched and evaluated to determine what works best for PineRidge. A significant learning lesson throughout the development and the initial implementation of this plan is the availability of an incredible amount of expertise and assistance to communities that are willing financially and technically commit to good forest stewardship. Increasing awareness and vegetative management not only maintains a healthy ecosystem, but also improves aesthetics and increases property values.

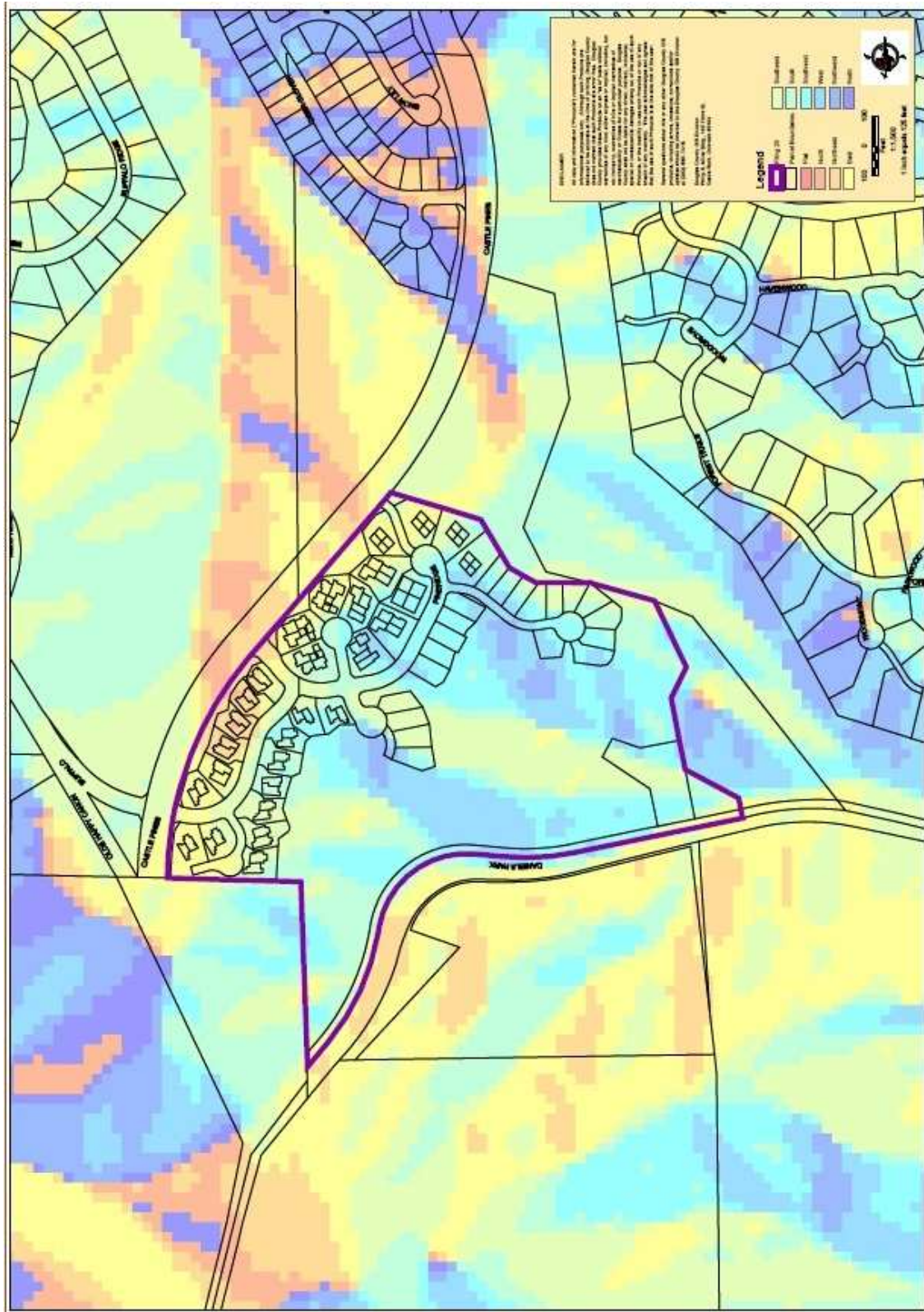
APPENDIX A PINERIDGE SITE MAP



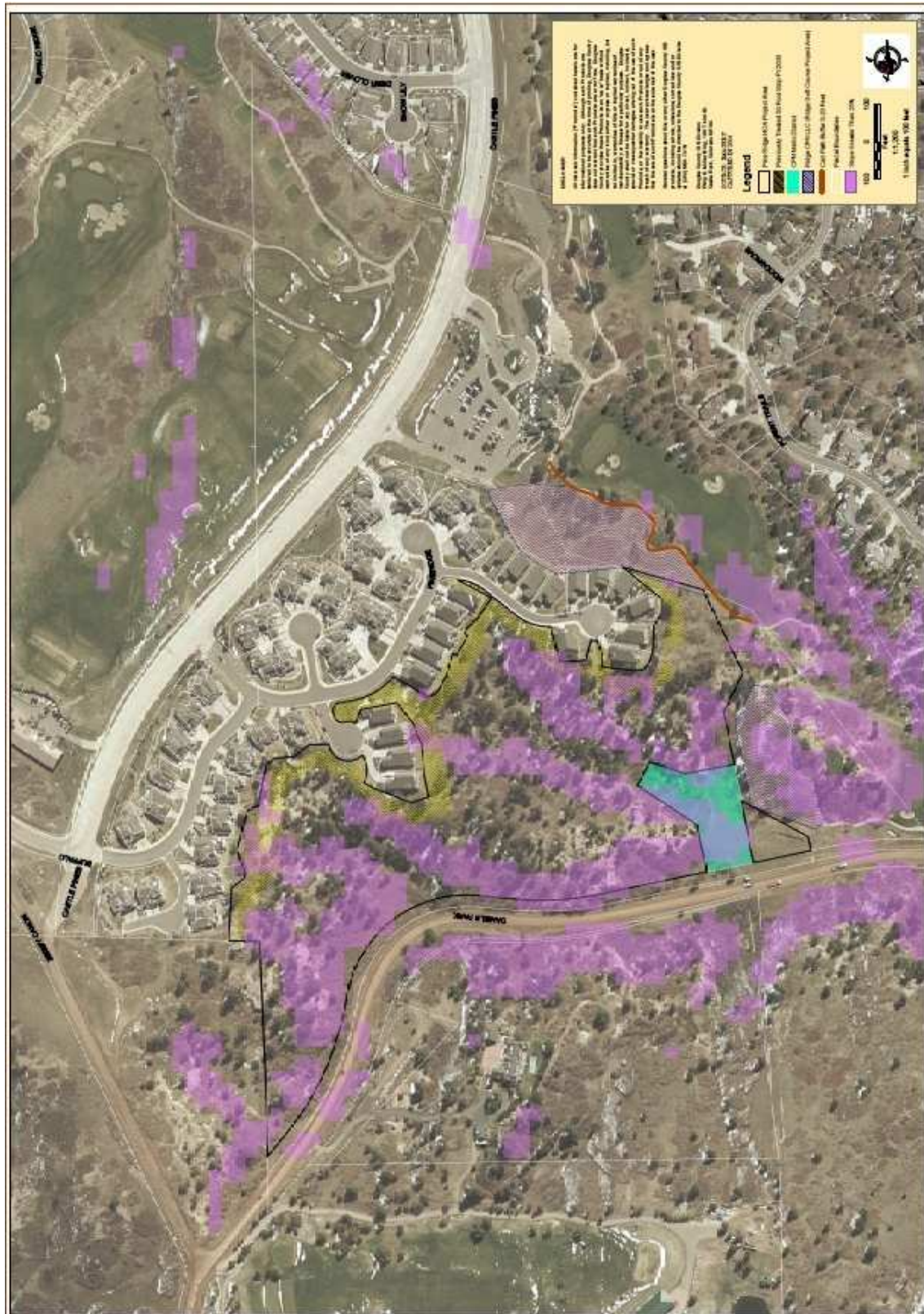
APPENDIX A PINERIDGE VEGETATION MAP



APPENDIX A PINERIDGE ASPECT MAP



APPENDIX A PINERIDGE SLOPE MAP



**APPENDIX A
PINERIDGE HYDRANT MAP**



Appendix B

Control of Gambel Oak Re-sprouting With Herbicides Applied to Stumps

The application of an herbicide to cut stumps of Gambel oak has been shown to be effective in greatly reducing or eliminating the re-sprouting of Gambel oak after it is cut. It should be done after the leaves have fully formed and are exporting significant carbohydrates (photosynthate) to the root systems. This downward flow carries the herbicide to the roots and kills it. Herbicides applied to stumps of leafless plants are ineffective.

One of the approved herbicides below should be applied to the stumps' cut surface within 2 to 3 minutes after the oak is cut. If applied immediately, an herbicide/water solution is sufficient. If the treatment is delayed and the cut surface has begun to dry, an herbicide/basal oil mixture must be used and applied to the top and around the collar of the stump.

For stumps greater than 3 inches in diameter, thoroughly wet the outer edge while avoiding herbicide runoff. This is because the only living tissue in larger trees is around the outer edge. Covering the entire cut surface will require more herbicide, most of which will provide little effect. For smaller stems it is appropriate to cover the entire cut surface. Herbicides can be applied using a backpack sprayer, squirt bottle, or paintbrush. Regardless of how the herbicide is applied, a tracer dye should be included to ensure treatment of all individual stumps.

Recommended Herbicides

Active Ingredient (Brand Names)	Recommended Mixture
Imazapyr (Arsenal AC or Chopper)	6 oz/gal (for Arsenal AC or 8-16 oz/gal (for Chopper)
Triclopyr (Garlon 3A)	50% in water
Triclopyr (Remedy or Garlon)	25% solution in water or basal oil
Triclopyr + fluroxypyr (Pasturegard)	50% solution in water or basal oil
Glyphosate (several brands)	50-100%

Garlon 3A is excellent for application to fresh stumps. If the surface of the stump has begun to dry prior to herbicide treatment, apply Chopper, Garlon 4, Remedy or Pasturegard in basal oil. Garlon 3A will not effectively mix with basal oils. Glyphosate is not effective on stumps that have started to dry after cutting. If immediate treatment is not possible, other herbicides should be selected since it should not be mixed with basal oils.

Note – home owners may personally apply these herbicides without a pesticide applicator's license. If they will be applied by a hired person, that person is required to have a license.

Appendix C
Fire Wise Educational Brochures

<u>You Are at Risk</u>	<u>22</u>
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Creating Wildfire Defensible Zones

Colorado State University Cooperative Extension Forestry Series – Creating Wildfire Defensible Zones

<u>Defensible Space</u>	<u>23-24</u>
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Fire Wise Plant Materials

Colorado State University Cooperative Extension Forestry Series – FireWise Plant Materials

Fire Wise Construction

Colorado State Forest Service – FireWise Construction Design & Materials Booklet

<u>Construction Design and Materials</u>	<u>25-26</u>
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<u>Decks Fact Sheet</u>	<u>27-28</u>
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<u>Roofing Fact Sheet</u>	<u>29-30</u>
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<u>Siding Fact Sheet</u>	<u>31-32</u>
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<u>Windows and Glass Fact Sheet</u>	<u>33-34</u>
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<u>What to do When...</u>	<u>35-36</u>
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Appendix C



You are at risk!



Rugged mountains, rolling foothills, majestic forests and green valleys, dry summers and mild winters — Colorado is home to millions of people and a vacation destination for thousands more. However, these same qualities which create scenic views, a desirable quality of life and a peaceful living environment, can also produce severe wildfire hazards.

Many people don't realize that they face serious wildfire danger. But if you live in the foothills, grasslands, or mountains of Colorado, **you are at risk!**

Making the problem even worse is the exploding population in once-rural areas surrounding municipalities. The result is that more homes

and lives are potentially threatened by wildfire every year.

When strong winds and hot, dry days lead to wildfires, you cannot expect fire engines to park in front of your home to protect your family and possessions. As much as they may want to, there just aren't enough firefighters or equipment to defend every home.

In a matter of minutes, a wildfire can jump from a burning hillside, race through your subdivision and destroy your home and your neighborhood. To protect your home, your family and your possessions, follow the steps outlined in this notebook – and make your property **"FireWise."**

To be **FireWise** you must carry out certain fire protection measures before a fire even starts. By following the following simple fire safety steps, your home will have a chance to survive while firefighters work to bring the wildfire under control. Remember, a fire department's effectiveness in battling a wildfire starts with **YOU!**

Appendix C



Defensible space

Your first defense against wildfire is to create and maintain a defensible space around your home. This does **not** mean your landscape must be barren. A defensible space is an area, either man-made or natural, where the vegetation is modified to slow the rate and intensity of an advancing wildfire. It also creates an area where fire suppression operations can occur and helps protect the forest from a structure fire.



A disaster waiting to happen.



This home is more easily defensible.

Defensible Space

Wildfire hazards can be effectively reduced by following these defensible space guidelines developed by the Colorado State Forest Service. (Also see Cooperative Extension Fact Sheet 6.302.)

- ❑ The dimensions of a defensible space are subjective and depend on site characteristics, but typically a defensible space, on flat ground, extends a minimum of 75 feet around a home. This distance should be extended if the structure is located on a slope.



- ❑ Thin out continuous tree and brush cover around structures. The initial 15 feet around a structure should consist of an area in which all flammable vegetation is removed.
- ❑ Beyond the initial 15 feet, trees should be thinned to 10-12 foot crown spacing. Occasionally, clumps of 2 or 3 trees are acceptable for a more natural appearance if additional space surrounds them.
- ❑ Mow dry grass and weeds to a height of 6 inches or less for a distance of 30 feet from all structures.



- ❑ Prune tree branches within the defensible space up to a height of 10 feet above the ground.
- ❑ Dispose of all slash and debris left from thinning by either chipping, hauling away or piling and burning (check with your local fire department for burning restrictions).

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- Remove shrubs and small trees, or other potential “ladder” fuels from beneath large trees. Left in place, these fuels can carry a ground fire into the tree crowns.



- Stack firewood and wood piles at least 30 feet from any structure. Clear away flammable vegetation within 10 feet of these wood piles. (Many



This home might not survive a wildfire.

homes have survived as a fire passed, only to burn later from a wood pile that ignited after the firefighters left.)

- Trim branches which extend over roof eaves.

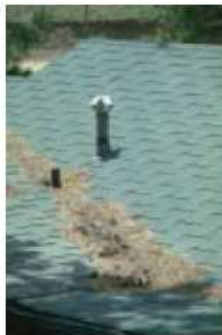


- Remove branches within 15 feet of chimneys.

- Maintain the defensible space annually by removing debris, shrubs and other vegetation which has accumulated during the year.



- Clean pine needles, leaves and other debris from roofs and gutters. This will eliminate an ignition source for firebrands, especially during hot, dry weather.



- Place liquefied petroleum gas (LPG) tanks and fuel storage containers at least 30 feet from structures. Clear flammable vegetation from within 10 feet of all such tanks.



Remember, after you have established your **FireWise** environment, you must maintain it regularly. If you have any questions about creating or maintaining defensible space around your home contact your local fire department or Colorado State Forest Service district office.

Appendix C



Construction design & materials

Make Your House Firewise

Your house may be vulnerable to a wildfire because of its design, construction and/or location. When preparing to build, buy or remodel, know what to look for in a **FireWise** home. A few modifications to your construction plans can reduce the chance of your house catching fire, or resist further damage if it does catch fire. Don't let your house become more fuel for a wildfire.

If you are building a new house, evaluate your building site.

- ❑ Choose a site away from heavily vegetated areas.



Probably not a wise location for a home.

- ❑ Build on the most level portion of the property.
- ❑ Avoid ridge tops, canyons and areas between high points on a ridge. These are extremely hazardous locations for houses and fire-fighters because they become natural chimneys, increasing the intensity of the fire.



This location would become a natural chimney during a wildfire.

- ❑ Set your structure a minimum of 30 feet back from the ridges or cliffs; increase the distance if the home will be higher than one story.

Building Materials

Use fire-resistive or non-combustible construction materials, combined with design techniques to prevent or slow the penetration of fire beyond your home's exterior. Whenever possible, use brick, rock or stucco – they resist fire much better than wood. If you decide on a wood exterior, it is **especially** important that you follow the **FireWise** practices in this notebook.

Your Roof

Your roof has the largest surface area of your structure and is the most vulnerable part of your house. It can easily catch fire from a wildfire's wind-blown sparks.

Use class A or B roofing materials, such as asphalt shingles, slate or clay tile, or metal.

Siding/walls

- ❑ Use fire-resistive or non-combustible construction materials



whenever possible. Use a minimum of a Class III flame-spread rated siding material – stone, brick and stucco are best. Walls should be constructed of fire-resistive materials from the ground to the roof overhang.

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- ❑ Roof eaves extending beyond exterior walls are also susceptible to flame exposure. Limit them in length and box or enclose them with fire-resistive materials.

Foundation

A building's foundation comes in contact with a spreading wildfire before other areas of the structure.

Enclose foundations with concrete block, cement walls, or other fire-resistive building materials.

Windows

Windows are often overlooked as fire hazards, but can be serious risks. The heat from a wildfire may be enough to ignite the furnishings inside your house through the windows.

- ❑ Minimize the size and number of windows on the downhill side of the house or the side that would most likely be exposed to a wildfire.
- ❑ Consider both size and materials for windows and sliding glass doors. Multi-paned glass provides insulation from trapped air and gives more protection from radiant heat than single-paned glass. It also reduce breakage potential from wind-blown debris.

Other Areas

- ❑ Cover exterior attic, soffit and underfloor vents with metal wire mesh (no larger than 1/8 of an inch) to prevent sparks from entering your home through vents.

- ❑ Install eave and soffit vents closer to the roof line than the walls.

- ❑ Design decks so that they are not located at the top of a hill directly in the line of a fire moving up slope.

- ❑ Enclose the undersides of balconies and decks on slopes with fire-resistive materials. If not enclosed, these areas can trap flames and burning embers that can ignite your home.



- ❑ Use weed-barrier fabric under deck and balcony areas to keep them free of vegetation.



- ❑ Cover chimneys and stovepipes with a non-flammable screen (mesh no larger than 1/2 inch).



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Decks

**General**

Though no material is “fire proof,” the proper use and assembly of fire-rated building materials can reduce a fire’s spread, and lengthen the amount of time it takes for a home to ignite and burn. Structural assembly is the layering of building materials.

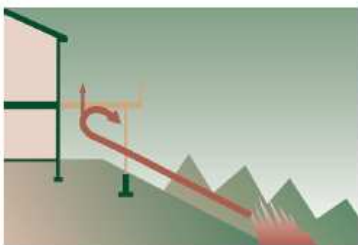
Decks are a very popular, well-used feature of many homes. However, they often face downhill towards a fire’s most likely approach – up a slope. Wood decks are also, highly combustible. Their constructional design makes them vulnerable to convective energy, wind blown embers, and trapped hot gasses. Decks are built perfectly to burn, almost as easily as wood stacked in a fireplace.

**Conventional wood decks**

All components of conventional wood decking are made of two inch thick wood with high surface to volume ratios – readily combustible and conducive to fire spread. Decks often ignite from radiant energy or wind-blown embers before approaching wildfire reaches the house. Use of Class A or B materials will reduce risk.

Isolate deck from fire with a patio and wall

If possible isolate the deck from fuels and fire by building a noncombustible patio and wall below it. A patio will ensure that no combustible materials are below the deck. The wall will act as a shield, deflecting both radiant heat and hot gasses from the fire.



Deck with a patio and a wall below

Heavy timber decks

The same rules for heavy timber siding applies to deck construction. A minimum thickness of six inches is required for structural members and posts, and three inches for decking and rails. The low surface-to-volume ratio of heavy timber takes longer to burn, making it a practical choice in moderate fire-hazard areas.

Composite decking

Composite decking is a mixture of recycled contents (generally wood and plastic). It’s very durable and has a high resistance to environmental weathering. It requires no sealants and is noncombustible. However, even though this material will not ignite, it will fail and melt. No known tests have been done on the toxicity of fumes released by this melted material.

Fire-resistive materials

The same structural assembly rules apply here as with home construction. The combination of noncombustible and rated materials can offer longer protection than a single material by itself. However, keep in mind, additional layering of materials will require a reinforced structural support.

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Other

- Enclose decks and balconies or use fire-resistant materials on surface and exposed underside to deflect flames and embers.
- Build a noncombustible patio and wall below to help deflect heat and energy from a fire.

Ratings are based on the assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

A (the best – 2 to 4 hrs)

B (1hr)

C (20 min)

Material Classification

Class A/B

- Heavy timber log (minimum of 6 inch diameter)
- Brick
- Stone
- Concrete
- Concrete synthetic stone
- Composition decking
- Metal/steel
- Membrane
- Fiber cement

Class C

- Wood panels and boards

Material **Class** is categorized by composition, or resistance to fire (combustible or noncombustible). Class A has the highest resistance; class C has the least resistance.

However, Class A materials generally need an underlayment of additional materials for class A *rating*. This is because Class A materials conduct heat beyond the exterior.

The combined use of fire-rated building materials, design, and assembly will give your home a chance of surviving a wildfire.

References

For additional information on protection your homesite, see:

- 6.302, *Creating Wildfire-Defensible Zones*
- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass seed Mixes to Reduce Wildfire Hazards*

For assistance, contact your local fire department, or the Colorado State Forest Service.

Appendix C

Roofing Materials



General

No material is “fire proof;” however, proper use and assembly of fire-rated building materials can reduce a fire’s spread and extend the amount of time it takes for a home to ignite and burn. (Structural assembly is the process of layering materials when building exterior walls and roof.)

Your roof is vulnerable to wildfire because it is the largest surface area of your home. The exposed, uneven surface of a roof can easily trap hot, wind-blown embers. Simple roof forms are easier to protect than complex ones due to less surface area and intersections, which may create heat traps. Use class A or B roofing materials to reduce risk.

Wood shakes and shingles

The thin physical make-up and surface structure of wood shakes and shingles are readily combustible and conducive to fire spread.



Asphalt shingles

Asphalt shingles are the most economical in terms of cost and life expectancy. Mineral reinforced asphalt shingles have a Class C rating and are gradually being replaced by fiberglass reinforced asphalt shingles, which are Class A or B materials.



Metal: sheets and shingles

Metal roofing is sturdy, lightweight, and non-combustible. However, it requires a gypsum underlayment for a class A assembly rating.

Metal roofing comes in the form of galvanized steel with paint; aluminum with paint; stainless steel; and, copper. It is also manufactured in the form of imitation wood shingles.



Fiber-cement shingles

These synthetic cement shingles are manufactured with either a fiberglass or wood mixture and are less brittle than solid cement shingles. They are a non-combustible material, but require an underlayment for a Class A assembly rating.

Membrane roofs

These hard or semi-solid materials (i.e. hot tar and rubber) are applied to flat roofs and are slightly combustible. However, they are often used in conjunction with other materials, such as cement, and can be applied over a gypsum underlayment for a Class A assembly rating.

Tile, clay tile, concrete and slate shingles

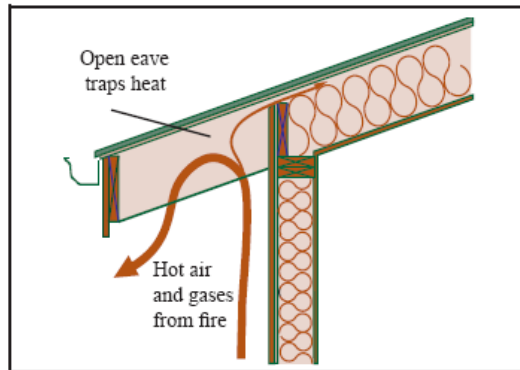
These thick noncombustible materials can be manufactured to look like wood shingles. They have a Class A rating and provide the best protection against fire.



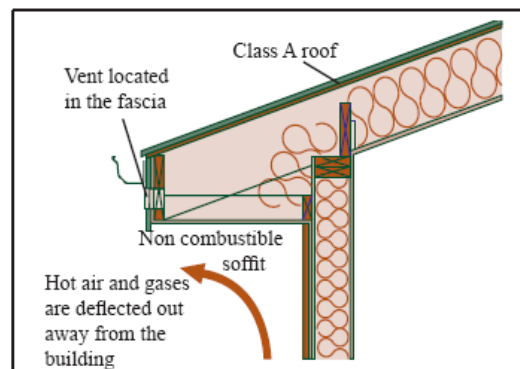
Appendix C

Eaves and soffits

Enclose open eaves with a flat soffit to deflect burning embers and gasses.



Open eave with no soffit



Fully enclosed soffit with isolated vent

The combined use of fire-rated building materials, assembly, and design will give your home a chance of surviving a wildfire.

Ratings are based on assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

- A (the best –2 to 4 hrs)
- B (1 hr)
- C (20 min)

Material Classification

Class A

Brick	Concrete
Tile	Slate
Clay	Asphalt
Metal	Fiber-cement

Class B

Pressure-treated shakes and shingles

Class C

Wood shakes and shingles
Plywood
Particleboard

Material **Class** is categorized by composition or resistance to fire (combustible or noncombustible). Class A has the highest resistance, Class C has the least resistance.

However, Class A materials generally need an underlayment of additional materials to give it an A *rating*. This is because Class A materials conduct heat beyond the exterior.

References

For additional information on protecting your homesite, see:

- 6.302, *Creating Wildfire-Defensible Zones*
- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass seed Mixes to Reduce Wildfire Hazard*

For more information or assistance contact your local fire department, or the Colorado State Forest Service.

Appendix C

Siding

**General**

No material is “fire proof.” However, the proper use and assembly of fire-rated building materials can reduce a fire’s spread and lengthen the amount of time it takes for a home to ignite and burn. Structural assembly is the process of layering materials when building exterior walls and roof.

Your home’s exterior walls and siding are most susceptible to radiant heat and open flame. Typically, the corners of your home are the weakest part of the structure. This is due to high surface to volume ratios. It is recommended that Class A or B *rated* siding materials be used.

Wood panels and boards

Wood panels and boards are readily combustible, and conducive to fire spread. A fire can burn through these materials to the underlying structure in less than 10 minutes. A gypsum underlayment can increase burn time to a one-hour rating.

**“Real” Stucco**

This noncombustible, one-hour rated material is a cement and gypsum mixture. It is applied in two or three coats and reinforced with metal mesh.

Synthetic stucco, exterior insulating finish system (EIFS)

Synthetic stucco is an acrylic cement finish on fiberglass mesh. This material is noncombustible and has no rating by itself.

This product is interesting because it significantly delays fire due to the insulation quality of the rigid foam and the fact that the system does not ignite; it actually fails and falls away. In moderate to high fire hazard situations this product works well.

Heavy timber or log construction

The low surface-to-volume ratio of heavy timber takes longer to burn; this makes it a practical choice in medium to high fire risk areas. The minimum thickness for log construction is six inches for the frame and exterior siding, and three inches for steps and decking.

**Concrete synthetic stone**

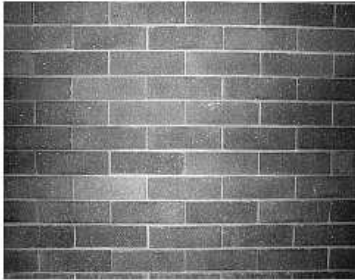
This noncombustible synthetic stone is reinforced with fiberglass and metal mesh, and has a one-hour rating.



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Brick, stone and block

These permanent, noncombustible materials usually have a two-hour rating, and are the best to use in regard to fire.



Material **Class** is categorized by composition, or resistance to fire (combustible or noncombustible). Class A has the highest resistance; class C has the least resistance.

Ratings are based on the assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

A (the best – 2 to 4 hrs)

B (1hr)

C (20 min)

Material Classification

Class A/B

- Brick
- Stone
- Block
- Concrete synthetic stone
- Metal
- Stucco
- Synthetic stucco
- Fiber cement panels, boards, shingles
- Heavy timber log (minimum of six-inch diameter)

Class C

- Wood panels and boards

However, Class A materials generally need an underlayment of additional materials to give it a class *A rating*. This is because Class A materials conduct heat beyond the exterior.

The combined use of fire-rated building materials, design, and assembly gives your home a better chance of surviving a wildfire.

References

For additional information on protecting your homesite, see Colorado State University Cooperative Extension Fact Sheets:

- 6.302, *Creating Wildfire-Defensible Zones*
- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass seed Mixes to Reduce Wildfire Hazards*

For more information or assistance contact your local fire department or the Colorado State Forest Service.

Appendix C

Windows and Glass

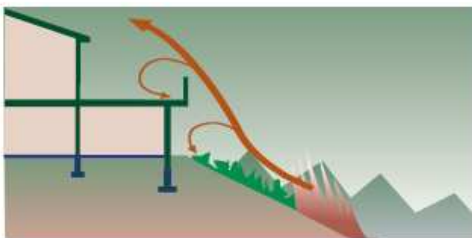
**General**

No material is “fire proof.” However, the proper use and assembly of fire-rated building materials can reduce a fire’s spread, and extend the amount of time it takes for a home to ignite and burn.

Windows are the weakest component of your home in relation to wildfire. Glass can fracture within five minutes in direct heat. If the glass breaks and dislodges, your home’s interior is vulnerable to fire. Keep the following in mind when building or remodeling your home:

Large vs. small windows

If fractured glass stays in place during a fire it can continue to shield hot gasses and open flame from entering your home. However, radiant energy can eventually ignite materials behind the window even with glass in place. Windows smaller than 2'x 2' will hold fractured glass in place better than larger windows.



Small and large windows

Thermopane or double glazed windows

Thermopane or double-glazed glass will last twice as long as conventional glass windows (ten minutes). The same effect of convective and radiant energy apply, but, because there are two layers, the second pane is protected until the glass on the first has completely failed and fallen away.

Low E and tempered glass

Tempered glass is resistant to high impact and high heat, while Low E (low emissivity) glass stops the transfer of radiant heat beyond its exterior. The combination of the two provides the best protection in a wildland fire.

Glass block

Glass block is also a good alternative. Though not as visually appealing, this fire resistive glass has the highest rating (90 minutes).

**Other:**

- Solid in-pane shutters can offer an additional 10-20 minutes of protection
- Solid aluminum frames are best. Upgrade frames when windows are upgraded to better insure glass stability and hold during a wildfire.

Windows and glass do not have “Material Classification” labels that other building materials have, but the same concept applies. Understand the difference between material *Class* and *Rating*, and use this knowledge when upgrading around your home.

Ratings are based on the assembly and layering of building materials and the burn time before ignition. Ratings are divided into classes:

- A (the best – 2 to 4 hrs)
- B (1hr)
- C (20 min).

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Material Classification (in general)

Class A

- Inorganic materials (metal, brick, tile etc.)

Class B

- Whole wood materials (usually pressure treated, or thick diameter)

Class C

- Reconstituted wood (plywood, particle board, hardboard etc.)

Material **Class** is categorized by composition, or resistance to fire (combustible vs noncombustible). Class A has the highest resistance; Class C has the least resistance.

However, Class A materials generally need an underlayment of additional materials to obtain class A *ratings*. This is because Class A materials conduct heat beyond the exterior.

The combined use of fire-rated building materials, design, and technique will give your home a fighting chance to survive a wildfire.

References

For additional information on protection your homesite, see:

- 6.302, *Creating Wildfire-Defensible Zones*
- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass seed Mixes to Reduce Wildfire Hazards*

For more information or assistance contact your local fire department, or the Colorado State Forest Service.

Appendix C



What to do when...

What To Do When You Are Threatened By Wildfire

If you have followed the advance preparation steps previously outlined, you have created a **FireWise** home that has a better chance of surviving a wildfire. But when a wildfire is immediately threatening your area, there are additional steps you can take.

- ❑ If you see a fire approaching your home, report it immediately by dialing 9-1-1. Stay on the phone to answer additional questions the emergency dispatcher may ask.
- ❑ Dress properly to prevent burns and lifelong scars. Wear long pants, cotton or wool long-sleeve shirts or jackets. Gloves and a damp cloth provide added protection. Do not wear short sleeve shirts or clothing made of synthetic fabrics.

Emergency Wildfire Survival Checklist

If there is time before the fire arrives, take the following actions:

Prepare to Evacuate

- ❑ Park your car in the garage, facing out with windows closed and keys in the ignition.
- ❑ Close the garage door but leave it unlocked. Disconnect the automatic garage door opener in case of power failure.
- ❑ Place valuable documents, family mementos and pets inside the car in the garage ready for quick departure.

Outside Your Home

- ❑ Move combustible yard furniture away from the house or store it in the garage (if it catches fire while outside, the added heat could ignite your house).
- ❑ Cover windows, attic openings, eave vents and sub-floor vents with fire-resistive material such as 1/2-inch or thicker plywood. This will eliminate the possibility of sparks blowing into hidden areas within the house.
- ❑ Close window shutters if they are fire-resistive.
- ❑ Attach garden hoses to spigots and place them so they can reach any area of your house.
- ❑ Fill trash cans and buckets with water and place them where firefighters can find them.
- ❑ If you have an emergency generator or a portable gasoline-powered pump that will supply water from a swimming pool, pond, well or tank, clearly mark its location and make sure it is ready to operate.
- ❑ Place a ladder against the house on the side opposite the approaching fire to help firefighters in rapidly getting onto your roof.

Inside Your Home

- ❑ Close all windows and doors to prevent sparks from blowing inside.
- ❑ Close all doors inside the house to slow down fire spread from room to room.

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- ❑ Turn on a light in each room of your house, on the porch and in the yard. This will make the house more visible in heavy smoke or darkness.
- ❑ Shut off liquefied petroleum gas (LPG) or natural gas valves.
- ❑ Move furniture away from windows and sliding glass doors to keep it from igniting from the heat of fire radiating through windows.
- ❑ Remove your curtains and drapes. If you have metal blinds or special fire resistant window coverings, close them to block heat radiation.

Evacuating

- ❑ If you do evacuate, use your pre-planned route, away from the approaching fire front.
- ❑ Keep a flashlight and portable radio with you at all times.
- ❑ If you are trapped by fire while evacuating in your car, park in an area clear of vegetation, close all vehicle windows and vents, cover yourself with a blanket or jacket and lie on the floor.
- ❑ If you are trapped by fire while evacuating on foot, select an area clear of vegetation along a road, or lie in the road ditch. Cover any exposed skin with a jacket or blanket. Avoid canyons that can concentrate and channel fire.

If You Stay in Your Home When a Fire Approaches

- ❑ Stay inside your house, away from outside walls.
- ❑ Close all doors, but leave them unlocked.
- ❑ Keep your entire family together and remain calm. Remember: if it gets hot in the house, it is many times hotter and more dangerous outside.

After the Fire Passes

- ❑ After a fire passes, check inside the attic for hidden burning embers.
- ❑ Check the roof immediately, extinguishing all sparks and embers. If you must climb onto the roof, use caution, especially if it is wet.
- ❑ Check inside the attic for hidden burning embers.
- ❑ Check your yard for burning woodpiles, trees, fence posts or other materials.
- ❑ Keep the doors and windows closed.
- ❑ Continue rechecking your home and yard for burning embers for at least 12 hours.

* Sanctuary Golf Course; The Sanctuary golf course is situated on a dramatic 220-acre site. Designed by renowned architect Jim Engh, the course was built in 1996 by RE/MAX Chairman and Co-Founder Dave Liniger. Liniger created the PGA-quality course in large part as a private enclave for charity golf tournaments. In the eight-year history of Sanctuary, charities have raised more than \$23 million.

† Daniels Park is 21 miles south of Denver, Colorado. Florence Martin donated the park to the City in two parcels. The first 40-acre area at the shelter house was given in 1920. The remainder of the 1,000.65 acres was donated in 1937. Most of the park is a Bison preserve and natural area where visitors can view the animals in a high-plains habitat. The shelter house and picnic areas offer some of the best views of the mountains that can be seen from the metro area.

‡ Cheyenne Chief Tall Bull, had by 1864 become acknowledged leader of the Dog Soldiers, the fiercest of the Cheyenne warrior societies. More than 100 lodges, or about 500 people, followed him and the other chiefs over eastern Colorado and western Kansas and Nebraska.

§ Cherokee Ranch & Castle includes land that originally belonged to two separate homesteads in the late 1890s: The Flower Homestead and the Blunt Homestead. The Johnson Family moved from the East and purchased the Flower homestead in 1924 and built the Scottish-style castle. They sold the property to Tweet Kimball in 1954. Tweet purchased adjacent land that had been the Blunt Homestead and renamed both pieces of land Cherokee Ranch, which today includes almost 3,200 acres of natural beauty and wildlife. In 1996, Tweet sold Cherokee Ranch in a conservation easement to Douglas County. Refer to <http://www.cherokeeranch.org/history.htm>

** The Devil's Head Lookout Trail to the top of the last remaining fire lookout in this part of the Colorado Rockies. The trail begins in the picnic area adjacent to Devil's Head Campground and ends at the last fire lookout for the Pike National Forest. The panorama extends 100 miles in every direction - to Pikes Peak to the south, Gray's and Torreya's peaks to the west, Long's Peak to the north and the Great Plains to the east. It's about a 45-minute trip south of Denver.